

The Usage of Oxygen Depleted Air Generated by a Hydrogen Fuel Cell for Cargo Fire Suppression

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Driven by increasingly stringent environmental regulations, the aviation community is exploring new integrated and greener technologies to satisfy aircraft power and electrical needs. Hydrogen based fuel cells are one such technology which is attractive to the aviation community due to their high power output, efficiency and environmental friendliness as compared to fossil fuels. The aviation industry has been evaluating and developing prototypes to support a variety of operations on-board. These operations range from replacing the airplane's main battery, ram air turbine or even the auxiliary power unit to supplying power to galley cooking equipment. In addition to the electrical power supply, industry is evaluating potential ways to utilize the byproducts of hydrogen based fuel cells, water and oxygen-deplete air (ODA). These byproducts could be used for fuel tank inerting, cargo bay fire suppression or water supply.

Testing in collaboration with Parker Hannifin, Airbus and Ballard Power Systems was conducted to evaluate the effectiveness of utilizing the oxygen depleted air that is generated by a hydrogen fuel cell for cargo fire suppression application. The testing was conducted in the FAA Fire Safety Branches 737 aircraft's aft cargo compartment, utilizing a lab-based proton exchange membrane fuel cell system. The presentation will provide test details and review the results of the testing.